AMENDMENT TO THE CLAIMS

1. (Currently amended) A method of processing a digital image corresponding to a scanned document ~~having corresponding image data comprising a plurality of pixel values and having an associated background~~, the method comprising:

   analyzing the image [data] to obtain statistical data;

   deriving [a] background noise removal data ~~tonemap function~~ for the entire image based on the statistical data;

   storing the entire image and the background noise removal data, and ~~tonemap function~~ the stored data available for batch processing; and

   providing user selection to:

   in a first case, use the stored image and the stored data to remove background noise from the image ~~wherein pixel values are converted using the tonemap function~~ prior to rendering the image; and

   in a second case, to bypass background noise removal in the stored image prior to rendering.

2. (Currently amended) The method as described in Claim 1 further comprising pre-processing the image [data] while analyzing the image [data] and using intermediate results obtained from pre-processing the image [data] to obtain the statistical data.

3. (Currently amended) The method as described in Claim 1 wherein the background noise removal data includes a ~~further comprising storing the~~ tonemap function or sampled values of the tonemap function ~~by generating a corresponding look-up table and storing the look-up table with the image data~~.

4. (Currently amended) The method as described in Claim 1 ~~further comprising storing~~ wherein the image [data] and the ~~tonemap function~~ background noise removal data are stored together ~~according to a selected document format~~.

5. (Currently amended) The method as described in Claim 1 wherein analyzing the image [data] further comprises estimating a global background tone value.

6. (Currently amended) The method as described in Claim 5 wherein the ~~tonemap function~~ background noise removal data is derived from the global background tone value.

7. (Cancelled)

8. (Original) The method as described in Claim 1 further comprising providing a user interface including an option allowing the selection of background noise removal on a page-by-page basis.

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9. (Currently amended) A method of estimating tone background in ~~processing~~ a digital image ~~corresponding to a scanned document having corresponding image data comprising a plurality of pixel values and having an associated background~~, the method comprising:

generating edge-metrics for each pixel of the digital image;

generating a first luminance histogram of all pixels in the image;

using the edge-metrics to generate a second luminance histogram of pixels near edges; and

estimating background luminance from the first and second histograms.

~~analyzing image data to obtain statistical data;~~

~~storing the image data and the statistical data;~~

~~providing user selection to:~~

~~in a first case, remove background noise from the image wherein pixel values are converted by deriving a background noise removal tonemap function from the stored statistical data; and~~

~~in a second case, to bypass background noise removal prior to rendering.~~

10. (Currently amended) The method as described in Claim 9 wherein ~~the statistical data is a global background tone value derived from the image data~~ for each pixel a first one of the edge-metrics is computed, the first edge-metric corresponding to the difference between the minimum and maximum values of neighboring pixels, and a pixel is tagged as an edge if its first edge-metric is above an adaptive threshold;

wherein for each pixel a second one of the edge-metrics is computed in proportional to the difference between the mean of the neighborhood minimum and maximum value, and one of the pixel value or smoothed pixel value, a pixel tagged as belonging to a light side or dark side of an edge according to its second edge-metric; and

wherein the pixels tagged as belonging to a light sight of an edge are used to generate the edge-luminance histogram.

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11. (Currently amended) The method as described in Claim 9 wherein estimating the background luminance includes obtaining minimum error threshold values from the histograms and weighting the threshold values ~~the statistical data is at least one histogram derived from the image data~~.

12. (Currently amended) The method as described in Claim 9 wherein performing the background removal includes bleaching all pixel values having a luminance that is more than the estimated background luminance~~further comprising pre-processing image data while analyzing image data and using intermediate results obtained from pre-processing the image data to obtain statistical data~~.

13. (Cancelled)

14. (Currently amended) The method as described in Claim 1 ~~9 further comprising providing a user interface including an option allowing the selection of background noise removal on a page-by-page basis~~ wherein the image is color-converted to a luminance-chrominance color space prior to obtaining the statistical data, and wherein the statistical data is obtained from the luminance channel.

15. (Currently amended) A system for processing a digital image corresponding to a scanned document ~~having corresponding image data comprising a plurality of pixel values and having an associated background~~, the system comprising:

statistical analyzer for analyzing the image ~~data~~ to obtain statistical data;

function derivator for deriving [a] background ~~noise~~ removal data ~~tonemap function~~ for the ~~entire~~ image based on the statistical data; and

data storage for storing the image and the background removal data together. ~~and the tonemap function~~;

whereby ~~user interface for selecting to, in a first case, remove~~ background removal can be performed on the digital image before and after rendering. ~~noise from the image, and in a second case, to bypass background noise removal prior to rendering;~~

~~background noise remover for removing noise from image data retrieved from storage dependent upon user selection.~~

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16. (New) The method of claim 1 wherein the statistical data and the background noise removal data are obtained in real time, as the document is being scanned.

17. (New) The system as described in Claim 15 wherein the statistical analyzer pre-processes the image while analyzing the image and uses intermediate results obtained from pre-processing the image to obtain the statistical data.

18. (New) The system as described in Claim 15 wherein the background removal data includes a tonemap function or sampled values of the tonemap function .

19. (New) The system as described in Claim 15 further comprising a user interface for allowing viewing of a rendering of image data dependent on the user selection.

20. (New) The system as described in Claim 15 further comprising a user interface including an option allowing the selection of background noise removal on a page-by-page basis.

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21. (New) Apparatus for estimating tone background in a digital image, the apparatus comprising:

means for generating edge-metrics for each pixel of the digital image;

means for generating a first luminance histogram of all pixels in the image;

means for using the edge-metrics to generate a second luminance histogram of pixels near edges; and

means for estimating background luminance from the first and second histograms.